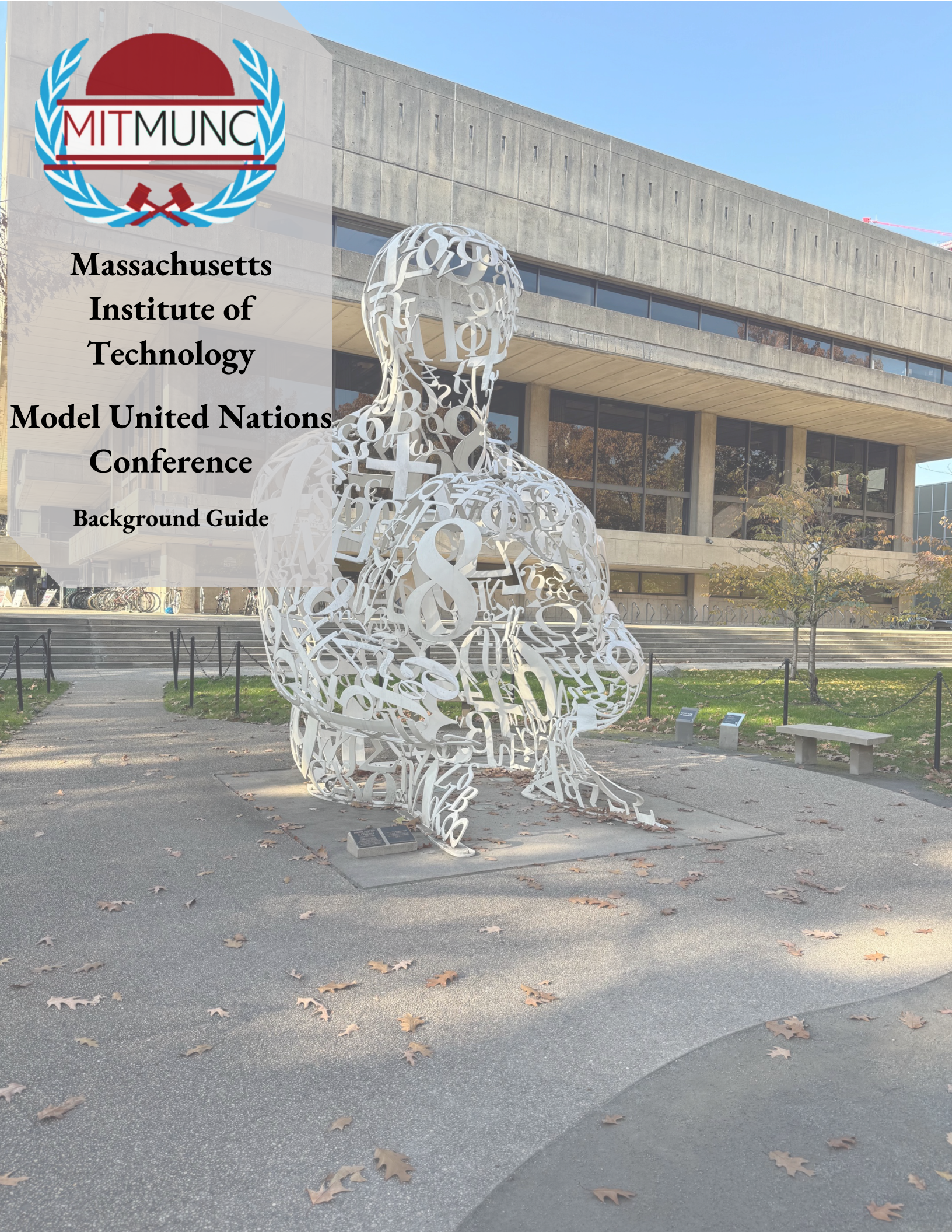

Massachusetts Institute of Technology

Model United Nations Conference

Background Guide

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Letter from the Secretary Generals

Dear Delegates,

It is with great pride and excitement that we formally invite you to the Massachusetts Institute of Technology's 16th annual Model United Nations Conference!

MITMUNC is a premier Model UN conference in which students from all over the world come together to solve the most pressing issues facing society today. This year's conference will be held during the weekend of Friday, February 9th through Sunday, February 11th, 2024, in-person.

At its core, MITMUNC is planned, organized, and directed by a passionate and ambitious team of MIT students that collectively form a diverse family of academic backgrounds and experiences. Our chairs and staff coordinate MITMUNC's committees from the ground up, posing questions and controversies that even the most experienced delegates will find challenging. Our dedicated Secretariat members complement the chairs and staff by overseeing all conference preparations, months in advance of the conference in order to ensure that our delegates walk away with one of the greatest experiences of their lives.

In previous years, MITMUNC delegates grappled with complicated human rights, economic, and environmental topics such as the Syrian Refugee crisis, argued the pros and cons of nuclear energy in the International Atomic Energy Agency, and even reacted to a flurry of assassinations witnessed in the Historical Committee! Attendees also enjoyed inspiring keynote addresses by Nazli Choucri, Professor of Political Science at MIT and leading researcher in international relations and cyber politics, as well as Richard B. Freeman, Faculty co-Director of the Labor and Worklife Program at the Harvard Law School. Delegates also enjoyed a well-deserved respite at the Delegate Dance social night.

We pride ourselves in hosting smaller committee sizes. This allows our attendees more freedom to contribute and distinguish themselves in their individual committee sessions. MITMUNC offers its attendees a truly unique opportunity to immerse themselves in a demanding intellectual environment, exposed to the ideas of others and tasked to employ the art of negotiation to pass meaningful resolutions.

Having experienced MITMUNC as chairs, then as Secretariat members and Secretaries-General, we are both humbled and thrilled to guide MITMUNC into its best conference yet. I now invite you to explore our brand new website to learn more about our conference. Do not hesitate in contacting us should you encounter any doubts along the way. Best of luck in the path ahead!

Sincerely,

Your Secretary Generals: Jad Abou Ali and Maya Abiram

For further inquiries, do not hesitate to contact us at sg-mitmunc@mit.edu.

MITMUNC XVI 2024

Letter from the Chairs

Dear Delegates,

We are so excited to have you! As your IAEA Co-Chairs, we can't wait to see what amazing conversation you all bring up in our committee in February. This has been a topic of great interest to the both of us, and we hope it will be to you as well!

Nuclear technologies are an ever-present topic of discussion, with their deep ties to scientific developments as well as social and political discourses. This committee will focus on all aspects of this debate, and seeing as this is an advanced committee, we anticipate intense and well-researched debate. Within this guide you find a lot of preliminary information, and it is expected that you will use this information and the linked sources to delve deeper into your delegation's positions.

The two of us bring a lot of Model United Nations experience to the table, and we are both thrilled to have this opportunity to continue to push our knowledge further. We hope to learn as much from you all as you learn from us. Happy researching!

Sincerely,

Your Chairs: Kaelyn Dunnell & Claire Martin

For further inquiries, do not hesitate to contact us at iaea-mitmunc-2024@mit.edu.

MITMUNC XVI 2024

Committee Introduction

The emergence of nuclear technologies in the mid-20th Century brought with it a myriad of questions; chief among them being how the world would be kept safe from the potentially devastating consequences of unregulated usage. In 1953, United States President Dwight D. Eisenhower addressed the United Nations General Assembly, calling for the formation of a group whose duties would include examining peacetime usages for atomic energy and the attempting to dampen the destructive potential of the world's nuclear stockpile.[1] This group would be named the International Atomic Energy Agency (or the IAEA) and was officially created in 1957. The IAEA is an "autonomous international organization within the United Nations system," meaning that it operates as an arm of the UN, and can work with other organizations to accomplish its goals.[2] Per their mission statement, the IAEA "develops nuclear safety standards and, based on these standards, promotes the achievement and maintenance of high levels of safety in applications of nuclear energy, as well as the protection of human health and the environment against ionizing radiation." [3]

IAEA

1 Address Before the General Assembly of the United Nations on Peaceful Uses of Atomic Energy, New York City | The American Presidency Project
2 The International Atomic Energy Agency
3 The IAEA Mission Statement

Topic A: Martial and Industrial Nuclear Containment

I. Introduction

Since their invention, nuclear technologies have been a source of fear. Their destructive potential, even with the best of intentions, has made them a site for fierce political debate for decades. This topic is focused on how the International Atomic Energy Agency can use its platform to forward efforts of nuclear containment. Containment is a broad term, but for the purposes of this committee it refers to an effort to mitigate the potential ills of nuclear technology. In an industrial context this looks like the implementation of proper safety protocols, and in the military context this looks like the enforcement of existing treaties and agreements.

II. History

A. The Treaty on the Non-Proliferation of Nuclear Weapons

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT)[4] was implemented in 1970. The NPT lays out the requirements of nuclear-weapon states (United States, France, Russia, United Kingdom and China) and non-nuclear-weapon states. Under the agreement, non-nuclear-weapon states are prohibited from creating or receiving nuclear weapons. Furthermore, nuclear-weapon states are forbidden from providing any non-nuclear-weapons states with nuclear weapons.[5] Every non-nuclear-weapon state is required to sign onto a comprehensive safeguards agreement, in which the IAEA is required to verify that each nation is abiding by the agreement.[6] The NPT also provides the IAEA with the discretion to supervise efforts by any non-nuclear-weapon state to use atomic energy for peaceful purposes. The NPT provides the groundwork for a lot of the IAEA's duties and responsibilities, and it is critical that all delegates start with a robust understanding of all it entails.

[4] INFCIRC/140 - Treat on the Non-Proliferation of Nuclear Weapons
[5] Treaty on the Non-Proliferation of Nuclear Weapons (NPT) | IAEA
[6] Safeguards agreements | IAEA

B. Nuclear Disasters and Their Effect on IAEA Policy

IAEA policy is ever-changing, and some of the most effective catalysts for this change are nuclear disasters. Throughout the first couple decades of the IAEA's existence, its focus was almost solely on nuclear weapons, largely due to the tumultuous political backdrop of the Cold War. This would all change when reactor number four of the Chernobyl Nuclear Power Plant would break down in 1986, exploding and releasing large amounts of radioactive waste into the atmosphere.[7] Following this accident, the IAEA provided immediate aid to the USSR, taking the form of radioactive waste management and attempting to limit environmental damage.[8] The IAEA would go on to draft two conventions that same year: the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency,[9] and the Convention on Early Notification of a Nuclear Accident.[10] Within these conventions is the requirement that the IAEA act as a coordinating body for emergency notification of a nuclear accident and the distribution of support or intervention when appropriate.

The 2011 Fukushima Daiichi Nuclear Power Station accident following a 9.0 magnitude earthquake and severe tsunami was another notable point in IAEA policy. Following the accident, the IAEA created the Action Plan on Nuclear Safety.[11] This plan raised the standards of safety and tasked the IAEA with providing member states with assistance to build adequately safe facilities.

III. International Actions

A. Adoption of Conventions

The most important actions the IAEA can take is the adoption of conventions. A few notable ones have already been mentioned, but below are more important ones to help guide your research.

[7] Chernobyl Accident 1986
[8] The 1986 Chornobyl nuclear power plant accident | IAEA
[9] INFCIRC/336 - Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
[10] INFCIRC/335 - Convention on Early Notification of a Nuclear Accident
[11] IAEA Action Plan on Nuclear Safety

Convention on Nuclear Safety (CNS): This treaty focuses on ensuring the safe operation of nuclear power plants worldwide. It established international benchmarks and obligations for member states to maintain high levels of nuclear safety and to continuously improve safety measures.[12]

Convention on the Physical Protection of Nuclear Material (CPPNM): The CPPNM aims to prevent the illicit trafficking of nuclear materials and the sabotage of nuclear facilities. It requires nations to protect nuclear materials during transport and outlines measures for the physical protection of nuclear facilities.[13]

Code of Conduct on the Safety and Security of Radioactive Sources: This code emphasizes the need for proper management and security of radioactive sources to prevent their unauthorized use or malicious intent. It sets guidelines for member states to ensure the safe handling, storage, and disposal of radioactive materials.[14]

Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: This convention addresses the safe management and disposal of spent nuclear fuel and radioactive waste. It sets international standards to ensure the safe handling, storage, and disposal of these materials.[15]

IV. Countries' Positions

A. Recognized Nuclear-Weapons States

United States: The United States was the first nation to develop and test a nuclear weapon, and signed the NPT in 1968. While they have not been officially accused of violating the NPT, some argue their refusal to begin denuclearization is a violation in and of itself.[16] A notable critique of the United States is Iran, their Deputy Foreign Minister for Legal and International Affairs said at a preparatory committee for an NPT review: "the United States

[12] INFCIRC/449 - Convention on Nuclear Safety
[13] INFCIRC/274/Rev.1 - The Convention on the Physical Protection of Nuclear Material
[14] Code of Conduct on the Safety and Security of Radioactive Sources
[15] INFCIRC/546 - Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
[16] Parsing Good Faith: Has the United States Violated Article VI of the Nuclear Non-Proliferation Treaty?

itself had violated articles I, IV and VI of the NPT and undermined all multilateral fora on disarmament."[17]

China: China ratified the NPT in 1992. Similar to the United States, while China has reaffirmed their commitment to non-proliferation, they have drastically increased the size of their nuclear arsenal. Additionally, they have provided Pakistan (a non-nuclear-weapon state) with a nuclear reactor, a move many consider a violation of the NPT. China and Pakistan's strategic relationship precedes China's signage of the NPT, and China claims that this fact its cooperation with Pakistan falls within guidelines.[18]

France: France also ratified the NPT in 1992, and it was the last nuclear-weapon state to ratify the treaty. France has greatly shrunk its nuclear weapon stockpile over the last decade, displaying a commitment to disarmament.[19]

United Kingdom: The United Kingdom signed the NPT in 1968. It currently has the smallest nuclear weapons stockpile of the 5 recognized nuclear-weapon states. The United Kingdom has a "submarine-based ballistic missile nuclear deterrence capability"[20] and has expressed their intentions to continue it for the foreseeable future. The United Kingdom also has made use of nuclear power, with about 15% of all electricity generated coming from nuclear sources.[21]

Russia: The USSR signed the NPT in 1968. Upon the collapse of the USSR in 1991, Russia inherited a vast majority of their nuclear assets. While the United States-Russia relationship has remained volatile, Russia has seemingly upheld its end of all arms treaties it entered into, resulting in the number of Russian strategic warheads decreasing drastically. That being said, Russian President Vladimir Putin has stated his intentions to

[17] NUCLEAR NON-PROLIFERATION TREATY BEING USED AS 'COVER' BY FOUR STATES FOR DEVELOPMENT OF WEAPONS PROGRAMMES, PREPARATORY COMMITTEE TOLD.
[18] China Constructs Nuclear Reactor in Pakistan | Arms Control Association
[19] Nuclear Disarmament France
[20] Nuclear Disarmament United Kingdom
[21] Nuclear Power in the United Kingdom

modernize Russia's nuclear arsenal. Russia also has a very strong (and growing) nuclear power system.[22]

B. Non-Recognized Nuclear States Who Developed Nuclear Programs

Pakistan: Pakistan has not signed the NPT, and conducted its first nuclear test in 1998. The development of the Pakistan nuclear program is largely attributed to its tensions with its neighbor India, another nation armed with nuclear weapons. Additionally, the Pakistan nuclear program exchanged technology with North Korea, another non-NPT compliant state.[23] In 2010 the Pakistani government asserted it would not sign the NPT unless it would be fully recognized as a nuclear-weapon state.

India: India also has not signed the NPT, and conducted their first nuclear test in 1974. Similar to Pakistan, India has stated that they would not ratify the NPT unless they are granted full nuclear-weapon state status. India also has an extensive nuclear energy program. Despite their non-signatory status, India has been largely compliant with IAEA safeguard agreements in the realm of nuclear reactors.[24]

Iran: In 2003 the IAEA found that Iran had violated many safeguard agreements including but not limited to: failing to report the importing of nuclear materials, and failing to report the processing of said nuclear material. The IAEA relayed these failures to the United Nations Security Council, who passed a resolution pressuring Iran to stop their program in 2006, Iran would refuse.[25] Over the next decade, the United States would levy multiple accusations of nuclear weaponization in Iran, accusations Iran would vehemently deny. Iran would not cooperate with IAEA investigations into these claims.

North Korea: North Korea is the only nation to sign the NPT and subsequently withdraw their signage. In 1993 the IAEA determined that North Korea had not disclosed the fact that they were reprocessing nuclear fuel. North Korea threatened to withdraw then, but they agreed to halt plutonium production in exchange for resumption of oil shipments from the

[22] Russia Nuclear Overview
[23] Did Pakistan help North Korea develop nuclear weapons? India-US-Japan want to know
[24] India, China and the Non Proliferation Treaty (NPT) - World Nuclear Association
[25] BBC NEWS | Middle East | Iran 'resumes' nuclear enrichment

United States and two light-war reactors. In 2002 North Korea was accused of continuing their nuclear program and the United States once again halted their oil shipments. In 2003 North Korea would officially withdraw from the NPT.[26]

South Africa: The South African apartheid government developed its own nuclear weapons program through the mid to late 20th century.[27] The program was started in response to the increased sociopolitical tensions within the country at that time, and they successfully established both nuclear reactors and bombs. International scrutiny mounted in the early 1990s, and South Africa would dismantle their nuclear weapons and sign the NPT in 1993. In 1994 the IAEA confirmed this dismantlement, marking South Africa as the first and only nation to develop nuclear weapons and willingly give them up.

V. Projections and Implications

A. International Cooperation

Projection: Tensions will continue to escalate between states that both possess nuclear weapons, India and Pakistan.

Implications: Beyond the potential escalation to nuclear conflict, the ability of the IAEA to deescalate will be put to the test.

B. Nuclear Safety and Possibility of Future Accidents

Projection: The Russo-Ukrainian war has come very close to numerous Ukrainian nuclear power plants.

Implications: There is a significant risk of another Chernobyl-level nuclear accident happening, and this time in a country currently being ransacked by an armed conflict.[28]

VI. Conclusion

Given the magnitude of the impact nuclear technologies wield, the imperative to regulate and contain their potential risks is undeniable. The International Atomic Energy Agency's

[26] Fact Sheet on DPRK Nuclear Safeguards | IAEA
[27] South Africa
[28] Ukraine still fears another Chernobyl-size disaster at Europe's largest nuclear plant : NPR

pivotal role in overseeing and steering the course of nuclear containment efforts cannot be overstated. By emphasizing the implementation of robust safety measures within industrial frameworks and reinforcing adherence to established treaties in military contexts, the agency stands as a beacon of global collaboration and responsibility. As this discussion concludes, it becomes evident that while nuclear technologies may evoke apprehension, proactive measures guided by institutions like the IAEA are crucial in harnessing their benefits while safeguarding against their inherent risks. Through continuous vigilance and cooperation, the agency can lead us toward a safer and more secure future in the realm of nuclear technology.

VII. Questions to be Addressed

1. How can the goal of nuclear containment be achieved with non-compliant states?
2. How should the IAEA balance respecting national sovereignty and protecting the general public?
3. How can the IAEA strengthen its protocols to prevent another nuclear accident?
4. Is the NPT sufficient for ensuring safety? Does a new treaty need to be created?
5. How can the IAEA ensure martial denuclearization doesn't impede advancements in peaceful nuclear applications?

VIII. Bibliography

1. UC Santa Barabara. (n.d.). *Address before the General Assembly of the United Nations on peaceful uses of Atomic Energy, New York City*. Address Before the General Assembly of the United Nations on Peaceful Uses of Atomic Energy, New York City | The American Presidency Project. https://www.presidency.ucsb.edu/documents/address-before-the-general-assembly-the-united-nations-peaceful-uses-atomic-energy-new
2. United Nations. (2015). *2015 review conference of the parties to the Treaty on the non-proliferation of nuclear weapons, 27 April to 22 May 2015*. United Nations. https://www.un.org/en/conf/npt/2015/
3. IAEA. (2014, May 26). *The IAEA Mission Statement*. IAEA. https://www.iaea.org/about/mission

4. IAEA. (1970, April 22). *Treaty on the Non-Proliferation of Nuclear Weapons.* IAEA. https://www.iaea.org/sites/default/files/publications/documents/infcircs/1970/infcirc140.pdf
5. IAEA. (2016, June 8). *The IAEA and the Non-Proliferation Treaty*. IAEA. https://www.iaea.org/topics/non-proliferation-treaty
6. IAEA. (2016, June 8). *Safeguards agreements*. IAEA. https://www.iaea.org/topics/safeguards-agreements
7. *Chernobyl Accident 1986*. Chernobyl | Chernobyl Accident | Chernobyl Disaster - World Nuclear Association. (n.d.). https://world-nuclear.org/information-library/safety-and-security/safety-of-plants/chernobyl-accident.aspx
8. IAEA. (2021, April 23). *The 1986 Chornobyl Nuclear Power Plant Accident*. IAEA. https://www.iaea.org/topics/chornobyl
9. IAEA. (1986, November 18). *Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency*. IAEA. https://www.iaea.org/sites/default/files/infcirc336.pdf
10. IAEA. (1986, November 18). *Convention on Early Notification of a Nuclear Accident.* IAEA. https://www.iaea.org/sites/default/files/infcirc335.pdf
11. IAEA. (2011, June). *IAEA action Plan on Nuclear Safety*. IAEA. https://www.iaea.org/sites/default/files/actionplanns.pdf
12. IAEA. (1994, July 5). *Convention on Nuclear Safety*. IAEA. https://www.iaea.org/sites/default/files/infcirc449.pdf
13. IAEA. (1980, May). *The Convention on the Physical Protection of Nuclear Material*. IAEA. https://www.iaea.org/sites/default/files/infcirc274r1.pdf
14. IAEA. (2014). *Code of Conduct on the Safety and Security of Radioactive Sources.* IAEA. https://www-pub.iaea.org/MTCD/publications/PDF/Code-2004_web.pdf
15. IAEA. (1997, December 24). *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.* IAEA. https://www.iaea.org/sites/default/files/infcirc546.pdf
16. Georgetown University Law Center. (1993). Parsing good faith: Has the United States violated article VI of ... - core. https://core.ac.uk/download/pdf/70375623.pdf

17. United Nations. (2004, April 27). *Nuclear NON-PROLIFERATION treaty being used as "cover" by four states for development of weapons programmes, Preparatory Committee told | UN press*. United Nations. https://press.un.org/en/2004/dc2921.doc.htm#:~:text=Specifically%2C%20he%20noted%20that%20the,weapons%20it%20was%20currently%20developing
18. *Arms control Today*. China Constructs Nuclear Reactor in Pakistan | Arms Control Association. (2023, September). https://www.armscontrol.org/act/2023-09/news-briefs/china-constructs-nuclear-reactor-pakistan
19. *Nuclear disarmament france*. The Nuclear Threat Initiative. (2023, January 23). https://www.nti.org/analysis/articles/france-nuclear-disarmament/
20. *Nuclear disarmament united kingdom*. The Nuclear Threat Initiative. (2022, November 1). https://www.nti.org/analysis/articles/united-kingdom-nuclear-disarmament/
21. *Nuclear Power in the United Kingdom*. Nuclear Power in the United Kingdom |UK Nuclear Energy - World Nuclear Association. (n.d.). https://world-nuclear.org/information-library/country-profiles/countries-t-z/united-kingdom.aspx
22. *Russia Nuclear Overview*. The Nuclear Threat Initiative. (2021, October 16). https://www.nti.org/analysis/articles/russia-nuclear/
23. Ghoshal, D. (2017, September 19). *Did Pakistan help North Korea develop nuclear weapons? India-US-japan want to know*. Quartz. https://qz.com/india/1080927/did-pakistan-help-north-korea-develop-nuclear-weapons-india-us-japan-want-to-know
24. *India, China & NPT*. India, China and the Non Proliferation Treaty (NPT) - World Nuclear Association. (2016, December). https://www.world-nuclear.org/information-library/safety-and-security/non-proliferation/india,-china-npt.aspx
25. BBC. (2006, February 13). *World | middle east | Iran "resumes" nuclear enrichment*. BBC News. http://news.bbc.co.uk/2/hi/middle_east/4709490.stm
26. IAEA. (2014, July 25). *Fact sheet on DPRK nuclear safeguards*. IAEA. https://www.iaea.org/newscenter/focus/dprk/fact-sheet-on-dprk-nuclear-safeguards
27. *South Africa Country Spotlight*. The Nuclear Threat Initiative. (2023b, October 23). https://www.nti.org/countries/south-africa/
28. Hayda, J. (2022, December 11). *Ukraine still fears another Chernobyl-size disaster at Europe's largest nuclear plant*. NPR.

https://www.npr.org/2022/12/11/1138382531/ukraine-fears-nuclear-disaster-zaporizhzhia-chernobyl-memories

Topic B: Advancing Sustainable Nuclear Energy: Nuclear Fusion

I. Introduction

The International Atomic Energy Agency (IAEA)[29] serves as a linchpin in the global efforts to ensure the responsible and sustainable use of nuclear energy. With the world facing unprecedented challenges in meeting growing energy demands while mitigating climate change, the IAEA Committee will delve into the intricate dynamics of nuclear energy. This background guide endeavors to provide an exhaustive examination of the committee's agenda, centering on the paramount aspects of safety protocols, non-proliferation measures, and innovative approaches that will define the future of nuclear energy. Particularly, this committee should focus on the advent of nuclear fusion technologies. The quest for harnessing nuclear fusion as a viable and sustainable energy source represents one of the most ambitious and complex scientific endeavors in human history. Against the backdrop of an escalating global demand for energy, coupled with the imperative to transition away from fossil fuels and mitigate climate change, the International Thermonuclear Experimental Reactor (ITER)[30] stands as a beacon of international collaboration and scientific innovation. As we convene in this session of the IAEA, it is imperative to embark on a comprehensive exploration of ITER, encompassing its historical evolution, the current status of the project, the technical intricacies of its design, the global governance structure underpinning its operations, and the profound socio-economic and environmental implications that hinge on its success.

II. History

A. Pioneering Discoveries & the Birth of Nuclear Power

The journey of nuclear energy commenced with groundbreaking discoveries in the early 20th century, notably the elucidation of nuclear fission.[31] Scientists such as Marie Curie and Enrico Fermi laid the groundwork for understanding the potential of nuclear

[29] IAEA
[30] ITER
[31] Outline History of Nuclear Energy

reactions for energy production. The post-World War II era witnessed the birth of nuclear power with the establishment of the first commercial nuclear power plants. This era marked the realization of the promise of abundant, low-carbon energy, sparking global interest in the application of nuclear technology for electricity generation.

B. Understanding Nuclear Fusion Energy

Nuclear fusion, the process that powers the sun and stars, has long captured the imagination of scientists and policymakers as a potential panacea for the world's energy challenges. Unlike nuclear fission, the process currently employed in nuclear power plants, fusion harnesses the power of merging atomic nuclei to release energy. The isotopes of hydrogen, deuterium and tritium, serve as the fuel, and the fusion process generates minimal radioactive waste while avoiding the risk of a catastrophic meltdown.[32]

The allure of nuclear fusion lies in its promise of a nearly limitless and clean energy source. If successfully harnessed, fusion has the potential to address the growing global demand for energy while mitigating the environmental impact associated with traditional energy sources. The scientific pursuit of controlled nuclear fusion, however, is not without its formidable challenges, necessitating a collaborative approach on an unprecedented scale.

C. The Technical Challenges and ITER's Role

The technical challenges of achieving controlled nuclear fusion are formidable, requiring temperatures in the millions of degrees Celsius and the confinement of a hot plasma. At the forefront of this endeavor is ITER—the International Thermonuclear Experimental Reactor—a collaborative initiative involving 35 nations. ITER represents a collective commitment to overcoming the scientific and engineering obstacles that have long impeded progress in fusion research.

Situated in Saint-Paul-lès-Durance, France, ITER employs a tokamak design to confine and control a plasma of hydrogen isotopes within a magnetic field. This experimental setup aims to achieve sustained fusion reactions, a milestone known as

[32] DOE Explains…Nuclear Fusion Reactions

"ignition." The success of ITER in reaching ignition would mark a transformative moment in the quest for practical nuclear fusion energy.[33]

D. Nuclear Energy Safety at the IAEA

As the world transitions towards a sustainable energy future, nuclear energy remains a vital component of the energy mix. Ensuring the safety of nuclear facilities and activities is paramount to the responsible use of this technology. The IAEA, with its evolving safety standards and commitment to continuous improvement, stands as a linchpin in the global effort to harness the benefits of nuclear energy while minimizing risks.[34][35]

To further strengthen the global safety regime, the IAEA conducts safety reviews and peer assessments of nuclear facilities and programs in Member States.[36] These reviews, conducted by international teams of experts, evaluate compliance with IAEA safety standards and identify areas for improvement. The collaborative nature of these assessments fosters a culture of openness and transparency, allowing Member States to share best practices and learn from each other's experiences.

III. International Actions

Addressing the multifaceted challenges and opportunities within the realm of nuclear energy requires a coordinated and collaborative international effort. Delegates are encouraged to explore a range of possible international actions that can contribute to the advancement of sustainable nuclear energy, ensuring safety, preventing proliferation, and fostering innovation.

[33] What is ITER?
[34] International Atomic Energy Agency (2021) Report.
[35] International Atomic Energy Agency (2019) Report.
[36] International Atomic Energy Agency (2022) Report.

A. Strengthening Non-Proliferation Measures

In order to strengthen non-proliferation measures, call for increased transparency and information-sharing among Member States regarding their nuclear programs to strengthen the effectiveness of IAEA safeguards; propose the expansion of nuclear weapons-free zones to regions where they do not currently exist, promoting regional security and stability; and advocate for the IAEA to play a more active role in facilitating diplomatic dialogues among nations to address regional nuclear proliferation concerns.

B. Promoting Innovation in Nuclear Energy

Some solutions for promoting innovation in nuclear energy: establish an international fund for collaborative research and development in the International Thermonuclear Experimental Reactor (ITER), encouraging Member States to contribute financially and share technological expertise; support the creation of a dedicated IAEA working group focused on evaluating and endorsing emerging nuclear technologies, fostering a platform for knowledge exchange and assessment; advocate for the establishment of an international consortium for nuclear fusion research, pooling resources and expertise to accelerate progress toward other viable fusion energy sources.

IV. Countries' Positions

A. United States of America

The United States, with its extensive history in nuclear energy, emphasizes the importance of advancing nuclear technologies for clean energy production. While maintaining a strong commitment to conventional nuclear power, the U.S. is also investing significantly in research and development for advanced reactor technologies, including small modular reactors (SMRs). The nation acknowledges the potential of nuclear fusion and supports international collaboration, including its active participation

in the ITER project. Emphasis is placed on ensuring safety, non-proliferation, and economic viability in the pursuit of nuclear energy advancements.[37]

B. China

As a rapidly growing economic powerhouse, China views nuclear energy as a crucial component of its energy portfolio to meet soaring demands while mitigating carbon emissions. China has made substantial investments in both traditional nuclear power plants and advanced reactor technologies, positioning itself as a global leader in nuclear energy development. China is actively engaged in fusion research, supporting initiatives like ITER and pursuing domestic research projects. The nation advocates for international cooperation to address shared challenges, emphasizing technology transfer and capacity-building in the global nuclear community.[38]

C. European Union

The European Union (EU) champions a balanced and sustainable approach to nuclear energy. Member States within the EU maintain diverse positions on the role of nuclear power in their energy transitions. While some nations are committed to phasing out nuclear power, others recognize its potential in achieving carbon reduction goals. The EU, as a collective entity, supports research on advanced nuclear technologies and is a key contributor to the ITER project. Coordinated efforts within the EU prioritize safety, security, and the responsible management of nuclear resources.[39]

D. Russia

Russia, with its extensive experience in nuclear energy, continues to be a proponent of nuclear power as a reliable and low-carbon energy source. The nation actively participates in the development of advanced reactor technologies and is a key partner in the ITER project. Russia places importance on global cooperation in nuclear research and development, emphasizing the need for equitable access to nuclear technologies.

[37] U.S. Department of Energy
[38] Nuclear Power in China
[39] Nuclear Power in the European Union

Addressing safety concerns and fostering international collaboration in nuclear innovation are integral aspects of Russia's stance within the IAEA.[40]

E. India

India recognizes the significance of nuclear energy in meeting its growing energy demands while minimizing environmental impact. The country has a diversified energy mix that includes conventional nuclear power and is actively pursuing research in advanced reactor technologies. India supports international collaboration on fusion research, contributing to initiatives like ITER. The nation emphasizes the need for technology transfer and capacity-building to ensure the inclusive development of nuclear energy capabilities, particularly in developing nations.[41]

F. Japan

In the aftermath of the Fukushima Daiichi nuclear disaster, Japan has undergone a significant reassessment of its energy policies. While committing to enhancing the safety of its existing nuclear facilities, Japan is actively investing in renewable energy sources. The nation is cautiously exploring the potential of advanced nuclear technologies and maintains a supportive stance towards international cooperation on fusion research, including participation in the ITER project. Japan underscores the importance of safety, transparency, and public engagement in the advancement of nuclear energy.[42]

G. Developing Nations

Many developing nations recognize the potential benefits of nuclear energy in achieving energy security and supporting economic development. However, challenges such as financial constraints, technological capacity, and public perception often pose hurdles to their nuclear ambitions. These nations, while expressing interest in the peaceful use of nuclear energy, seek international support in capacity-building, technology transfer, and access to financing for nuclear projects. The IAEA plays a

[40] Nuclear Power in Russia
[41] Nuclear Power in India
[42] Nuclear Power in Japan

crucial role in facilitating such support to ensure the responsible development of nuclear capabilities.[43]

V. Projections and Implications

A. Growing Global Role of Nuclear Energy

Projection: Nuclear energy is anticipated to play an increasingly pivotal role in the global energy mix. As nations seek to reduce carbon emissions and transition to more sustainable energy sources, nuclear power is expected to contribute significantly to the overall energy portfolio.

Implications: The growing global reliance on nuclear energy necessitates robust safety standards, stringent non-proliferation measures, and international collaboration. Delegates should consider the potential implications of increased nuclear energy deployment on energy security, environmental sustainability, and geopolitical dynamics.

B. Advancements in Advanced Reactor Technologies

Projection: Continued research and development efforts in advanced reactor technologies, such as small modular reactors (SMRs)[44] and Generation IV reactors, are likely to yield technological breakthroughs. These innovations promise enhanced safety features, greater flexibility, and improved efficiency in nuclear power generation.

Implications: The integration of advanced reactor technologies requires careful consideration of safety standards, regulatory frameworks, and international cooperation. Delegates should anticipate the implications of deploying these technologies, including their impact on existing infrastructure, economic viability, and public perception.

[43] Emerging Nuclear Energy Countries
[44] Small Modular Reactors

C. Nuclear Fusion on the Horizon

Projection: The pursuit of nuclear fusion, exemplified by projects like ITER, is expected to advance further, bringing humanity closer to achieving sustained fusion reactions. While commercial fusion power plants may still be on the horizon, progress in research and development is likely to accelerate.

Implications: The successful realization of nuclear fusion has transformative implications for global energy security. Delegates should explore the potential geopolitical shifts, economic considerations, and the role of the IAEA in facilitating international collaboration to harness the benefits of fusion energy.

D. Safety and Security Challenges

Projection: With the expansion of nuclear energy, safety and security challenges may evolve. Advances in technology necessitate ongoing efforts to update and strengthen safety standards. Additionally, the risk of unauthorized access to nuclear materials and facilities remains a concern, requiring continuous vigilance.

Implications: Delegates should anticipate the evolving safety landscape and consider the implications of new technologies on emergency preparedness, response mechanisms, and international cooperation in nuclear security.

E. International Collaboration and Diplomacy

Projection: The IAEA is poised to play an increasingly vital role in facilitating international collaboration and diplomacy in the nuclear sphere. As nations pursue advancements in nuclear energy and fusion, diplomatic initiatives, and multilateral agreements are likely to gain prominence.

Implications: Delegates should be mindful of the diplomatic implications of advancing nuclear technologies. Strengthening international partnerships, promoting knowledge-sharing, and fostering a collaborative spirit are essential components of addressing global challenges in nuclear energy.

F. Addressing Environmental Concerns

Projection: The environmental impact of nuclear energy, including waste management and disposal,[45] is likely to be a focus of international attention. Efforts to develop sustainable solutions for nuclear waste and minimize the ecological footprint of nuclear projects are anticipated.

Implications: Delegates should consider the environmental implications of advancing nuclear energy and fusion. Discussions should encompass strategies for responsible waste management, environmental monitoring, and the development of technologies with reduced environmental impact.

G. Addressing Environmental Concerns

Projection: The advancement of nuclear energy and fusion has socio-economic implications, ranging from job creation to energy affordability. The integration of nuclear technologies into national energy strategies requires a careful balance of economic considerations and societal concerns.

Implications: Delegates should assess the potential socio-economic impacts of advancing nuclear technologies, including their effects on local communities, workforce development, and the broader economic landscape.

VI. Conclusion

In conclusion, the deliberations within the International Atomic Energy Agency (IAEA) represent a pivotal juncture in the global pursuit of advancing nuclear energy and fusion. As we navigate the intricate landscape of technological innovation, safety imperatives, and international collaboration, the collective responsibility of Member States comes to the fore. The decisions made within this committee will echo in the annals of global energy history, shaping a future where nuclear technologies contribute to a sustainable and resilient energy infrastructure. In the spirit of diplomacy, cooperation, and shared aspirations, the IAEA is poised to lead the charge toward a future where the transformative potential of nuclear energy and fusion is harnessed for the benefit of all humanity. As we embark on this journey, let our collective commitment to responsible

[45] Radioactive Waste Management

stewardship guide us toward a world where nuclear advancements contribute to a brighter and cleaner energy future.

VII. Questions to be Addressed

- How can the IAEA facilitate the development of comprehensive safety protocols for advancing nuclear energy and fusion technologies?
- How might successful progress in nuclear fusion impact global energy security, and what role can the IAEA play in ensuring equitable access to fusion technologies?
- What measures can be implemented to enhance non-proliferation efforts in the context of advancing nuclear technologies, including fusion?
- What strategies can Member States employ to address environmental concerns related to nuclear energy, including waste management and minimizing ecological footprints?
- In the context of nuclear fusion, how can environmental impact assessments be integrated into the development and deployment of fusion technologies?
- How can the IAEA and Member States work together to enhance public awareness and understanding of nuclear energy and fusion, dispelling myths and fostering informed discourse?

VIII. Bibliography

1. "ITER: The World's Largest Fusion Experiment." *IAEA*, IAEA, 13 May 2021, www.iaea.org/bulletin/iter-the-worlds-largest-fusion-experiment.
2. "The Way to New Energy." *ITER*, www.iter.org/. Accessed 8 Dec. 2023.
3. "Outline of the History of Nuclear Energy." *History of Nuclear Energy - World Nuclear Association*, world-nuclear.org/information-library/current-and-future-generation/outline-history-of-nuclear-energy.aspx. Accessed 8 Dec. 2023.
4. "Doe Explains...Nuclear Fusion Reactions." *Energy.Gov*, www.energy.gov/science/doe-explainsnuclear-fusion-reactions#:~:text=Nuclear%20Fusion%20reactions%20power%20the,The%20leftover%20mass%20becomes%20energy. Accessed 8 Dec. 2023.

5. “What Is Iter?” *ITER*, www.iter.org/proj/inafewlines. Accessed 8 Dec. 2023.
6. International Atomic Energy Agency. (2021). "IAEA Safety Standards Series: Fundamental Safety Principles." Vienna, Austria.
7. International Atomic Energy Agency. (2019). "IAEA Safety Standards Series: General Safety Requirements." Vienna, Austria.
8. International Atomic Energy Agency. (2022). "IAEA Safety Standards Series: Specific Safety Guides." Vienna, Austria.
9. “Nuclear: Department of Energy.” *Energy.Gov*, www.energy.gov/nuclear#:~:text=Nuclear%20power%20remains%20an%20important,threat%20of%20global%20climate%20change.&text=The%20Idaho%20Operations%20Office%20oversees,in%20accordance%20with%20DOE%20directives . Accessed 9 Dec. 2023.
10. “Nuclear Power in China.” *China Nuclear Power | Chinese Nuclear Energy - World Nuclear Association*, world-nuclear.org/information-library/country-profiles/countries-a-f/china-nuclear-power.aspx. Accessed 9 Dec. 2023.
11. “Nuclear Power in the European Union.” *Nuclear Power in the European Union - World Nuclear Association*, world-nuclear.org/information-library/country-profiles/others/european-union.aspx. Accessed 9 Dec. 2023.
12. “Nuclear Power in Russia.” *Nuclear Power in Russia | Russian Nuclear Energy - World Nuclear Association*, world-nuclear.org/information-library/country-profiles/countries-o-s/russia-nuclear-power.aspx. Accessed 9 Dec. 2023.
13. “Nuclear Power in India.” *Nuclear Power in India | Indian Nuclear Energy - World Nuclear Association*, world-nuclear.org/information-library/country-profiles/countries-g-n/india.aspx. Accessed 9 Dec. 2023.
14. “Nuclear Power in Japan.” *Nuclear Power in Japan | Japanese Nuclear Energy - World Nuclear Association*, world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power.aspx. Accessed 9 Dec. 2023.
15. “Emerging Nuclear Energy Countries.” *Emerging Nuclear Energy Countries | New Nuclear Build Countries - World Nuclear Association*, world-nuclear.org/information-library/country-profiles/others/emerging-nuclear-energy-

countries.aspx#:~:text=About%2030%20countries%20are%20considering,their%20first%20nuclear%20power%20plants. Accessed 9 Dec. 2023.

16. World Nuclear Association. (2021). "Small Nuclear Power Reactors." [Online] Available at: https://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-power-reactors/small-nuclear-power-reactors.aspx
17. "Radioactive Waste Management." *Radioactive Waste Management | Nuclear Waste Disposal - World Nuclear Association*, world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-waste-management.aspx. Accessed 9 Dec. 2023.
18. International Atomic Energy Agency. (2022). "IAEA Annual Report 2021." Vienna, Austria.

    ITER Organization. (2022). "ITER: Bringing a Star to Earth." [Online] Available at: https://www.iter.org/
19. International Atomic Energy Agency. (2020). "Technology Roadmap: Nuclear Energy." Vienna, Austria.
20. World Nuclear Association. (2022). "Nuclear Power in the World Today." [Online] Available at: https://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-power-in-the-world-today.aspx
21. Nuclear Energy Agency. (2021). "Nuclear Fusion: Status and Potential for Development." [Online] Available at: https://www.oecd-nea.org/ndd/pubs/2021/7399-nuclear-fusion.pdf
22. World Nuclear Association. (2022). "Nuclear Fusion Power." [Online] Available at: https://www.world-nuclear.org/information-library/current-and-future-generation/nuclear-fusion-power.aspx

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